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Mental health predictors of breastfeeding initiation and continuation among HIV infected and uninfected women in a South African birth cohort study

Eileen Thomas, MBChB, FCPsych¹, Caroline Kuo, DPhil^{1,2}, Sophie Cohen, MD, PhD³, Jacqueline Hoare, MBChB, PhD¹, Natassja Koen, MBChB, PhD^{1,5}, Whitney Barnett, MPH³, Heather J. Zar, MBBCh, FCPaeds, PhD^{3,4}, and Dan J. Stein, FRCPC, PhD^{1,5}

¹Department of Psychiatry and Mental Health, University of Cape Town, J-Block, Groote Schuur Hospital, Observatory, Cape Town 7925, South Africa

²Department of Behavioral and Social Sciences and Center for Alcohol and Addiction Studies, Brown University, 121 South Main Street, Box G-S121-4th Floor, Room 406, Providence, RI 02912, USA

³Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital, Cape Town, South Africa

⁴Medical Research Council Unit on Child and Adolescent Health, South Africa

⁵Medical Research Council Unit on Anxiety and Stress Disorders, South Africa

Abstract

Breastfeeding is a cost-effective, yet underutilized strategy to promote maternal and infant health in low and middle income countries (LMICs). Breastfeeding remains challenging for mothers living with HIV in LMICs, yet few studies have examined mental health predictors of breastfeeding initiation and continuation. We investigated breastfeeding among mothers by HIV status in South Africa, evaluating predictors of breastfeeding initiation and continuation to identify intervention-targets. Breastfeeding patterns were investigated in a subsample of 899 breastfeeding mothers from the Drakenstein Child Health Study; a prospective birth cohort of 1,225 pregnant women, between March 2012 and March 2015 in a peri-urban area. Breastfeeding was assessed at 5 time-points between 6 weeks and 24 months' infant age. Cox proportional hazard models evaluated breastfeeding initiation and duration. Logistic regression models with breastfeeding non-initiation as the outcome parameter were performed to determine associations with maternal sociodemographic, psychosocial factors and gestational outcomes. More HIV-uninfected mothers initiated breastfeeding (n=685, 97%) than HIV-infected mothers (n=87, 45%). Median duration of exclusive breastfeeding was short (2 months), but HIV-infected mothers engaged in exclusive breastfeeding for longer duration than uninfected mothers (3 vs 2 months). Despite concerning high rates, mental disorders were not significant predictors of breastfeeding behaviour.

Correspondence: Dr Eileen Thomas, Department of Psychiatry and Mental Health, University of Cape Town, J Block, Groote Schuur Hospital, Cape Town 7925, South Africa, Phone: +27214045408, Fax: +27214488158, dreileenthomas@gmail.com.

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Employment and HIV diagnosis during pregnancy predicted a lower likelihood of breastfeeding initiation among HIV-infected mothers, while employment was associated with earlier breastfeeding-discontinuation in HIV-uninfected mothers. Findings indicate that future interventions should target sub-populations such as HIV-infected women because of distinct needs. Workplace interventions appear particularly key for mothers in our study.

Keywords

breastfeeding; exclusive breastfeeding; psychosocial; HIV; South Africa

1. Introduction

Breastfeeding confers numerous health benefits to mothers and infant and is an essential strategy for reducing morbidity and mortality in low and middle income countries (LMICs) where malnutrition and infectious diseases are common^{1,2}. The World Health Organization's (WHO) infant feeding guidelines emphasize exclusive breastfeeding for the first 6 months of life as a cost-effective, safe source of nutrition³. In LMICs with large HIV epidemics such as South Africa, in the presence of national ART programmes with high coverage of pregnant and breastfeeding women, breastfeeding benefits outweigh risks of vertical HIV transmission⁴. As such, WHO recommends HIV-infected mothers exclusively breastfeed from birth to 6 months and receive antiretroviral therapy (ARV) to limit mother to child (PMTCT) HIV transmission; breastfeeding is recommended until 12 months^{5,6}. South African PMTCT guidelines emphasize exclusive breastfeeding for the first 6 months, and complementary feeding thereafter⁷.

In South Africa, Prevention of Mother to Child Transmission (PMTCT) commenced in 2002 and included provision of free infant formula milk provision at public health facilities to HIV infected mothers who chose not to breastfeed⁸. The South African PMTCT program underwent several revisions between 2002 and 2015 in tandem with emerging global health evidence^{9,10}. Policies to encourage initiation and continuation of exclusive breastfeeding regardless of mother's HIV-status were adopted in 2012¹¹ and 2013¹². These included halting the provision of formula milk to HIV-infected mothers, unless medically indicated¹¹. However, the phasing-out of free infant formula milk occurred at different time point across the 9 provinces of South Africa. In the Western Cape Province, no new PMTCT mothers were issued formula milk only from 1 April 2015 and distribution was concluded by 30 September 2015¹³.

Despite clear best-evidence clinical guidelines and strong policy support, initiation and continuation of breastfeeding remain a challenge for women in general^{14,15}, and among HIV-infected mothers specifically¹⁶. In South Africa, exclusive breastfeeding rates, regardless of HIV status, remains low at approximately 32%¹⁷. Breastfeeding practices among uninfected mothers are slightly better compared to HIV-infected mothers^{18,19}, but are still below ideal targets²⁰.

Many studies examining barriers and facilitators of breastfeeding in LMIC, including South Africa has since been generated¹⁹. Pregnancy and gestational factors such as unplanned

pregnancy, nulliparity, caesarean section, infant male gender and low birth weight to be negatively associated with breastfeeding behaviour^{14,21,22}. Among HIV-infected mothers HIV-infection and a low CD4⁺ T-cell count during pregnancy to be associated with non-initiation^{23–25}, whilst low socioeconomic status and large family size have been associated with early breastfeeding cessation²⁶. Notably absent are studies in generalized HIV epidemic that examine factors that disproportionately affect LMIC mothers such as mental health disorders.

The prevalence of maternal mental health disorders is a significant issue in LMICs^{27,28}, and among populations infected or affected by HIV²⁹. Females in LMICs are more likely to be exposed to risk factors for poor mental health including trauma and HIV^{27,30}. Depression, anxiety, intimate partner violence (IPV), as well as alcohol and smoking during pregnancy have all been shown to negatively influence breastfeeding behaviour^{31–36}. Yet, most data on the relationship between maternal mental health and breastfeeding come from high-income countries.

The aim of this study was to investigate mental health predictors of breastfeeding initiation and continuation in a South African birth cohort study in a LMIC with a high prevalence of HIV.

2. Methods

Data were derived from a prospective study of mother-infant pairs enrolled in the Drakenstein Child Health Study (DCHS), a multidisciplinary, population-based birth cohort study investigating the determinants of child health in the Western Cape, South Africa³⁷.

2.1 Study-setting and inclusion criteria

Between March 2012 to March 2015, pregnant women residing in the Drakenstein sub-district, outside Cape Town were enrolled in the DCHS. The Drakenstein sub-district is a peri-urban, low socioeconomic community. Women were recruited from two primary health care clinics, Mbwekeni and TC Newman that serve two separate communities, a black African population and a mixed ancestry community. Both clinics form part of the well-established, free primary health care system utilized by more than 90% of the population. Pregnant women between 22 to 28 weeks of gestation were enrolled if they were at least 18 years of age, intended to live in the Drakenstein district for at least one year and gave informed consent. Only mothers with complete breastfeeding and antenatal psychosocial health data were included in this analysis.

2.2 Sample

Between March 2012 and March 2015, N=1,225 pregnant women were enrolled in the DCHS, fig A.1. Of this sample, n=1,136 mothers gave live births to 1,142 infants (including 4 twins and 1 triplet). Mothers of twins and triplets were excluded from this analysis and 238 mothers (20%) were also excluded because of missing breastfeeding and/or mental health data. Therefore, n=899 mother-infant dyads were included in this analysis, fig A.1.

2.3 Measures

Reliable and validated questionnaires suitable for use in South Africa were administered to participants at antenatal clinic visits between 28 and 32 weeks' gestation as previously described^{29,37}.

Breastfeeding—Breastfeeding practices were assessed at postnatal study visits conducted at 6–10 weeks, 14 weeks, 6 months, 9 months, 12 months, 18 months and 24 months of child age. At each visit, mothers completed a 36-item questionnaire which included detailed questions on current child feeding practices, including whether child was currently receiving breastmilk, formula milk or both, start dates and stop dates of each, frequency of current feeds and composition of formula, were given. Dietary intake of solid foods was recorded by mothers indicating frequency (Never, Daily, Weekly or Monthly) from a list of 21 food items. Among mothers who reported initiating breastfeeding, duration of exclusive breastfeeding was calculated according to when mothers reported that they had first introduced formula or complementary feeds; duration of any breastfeeding was calculated as the time until mothers reported overall breastfeeding cessation.

Maternal Sociodemographic variables—Socioeconomic and demographic characteristics at enrolment were determined using a questionnaire adapted from the South African Stress and Health Study (Herman et al., 2009) including items assessing income, education, employment, housing and family. At their antenatal visit, mothers completed a food security and partner support questionnaire^{29,37}

Maternal mental health—To assess depressive symptoms, the Edinburgh Postnatal Depression Scale (EPDS)³⁸ was completed at 28–32 weeks gestation. The SRQ-20 was used to screen for more general symptoms of psychological distress including depressive and anxiety disorders³⁹. Trauma-exposure measures included the Childhood Trauma Questionnaire (CTQ-20) and the Intimate Partner Violence Questionnaire (IPV) to assess lifetime and recent (past year) exposure to emotional, physical and sexual abuse^{40,41}. The modified Post Traumatic Stress Disorder Symptom scale (MPSS)⁴², a self-report measure which mirrors the DSM-IV criteria for PTSD, was completed if a participant reported exposure to a life-threatening trauma using the World Mental Health Life Events Questionnaire⁴³. The MPSS was categorized into three categories: no trauma exposure, trauma-exposed without PTSD, and suspected PTSD. Substance use was measured with the Alcohol, Smoking and Substance involvement screening test (ASSIST), a WHO-developed self-report tool assessing substance use across ten categories of substances⁴⁴.

HIV clinical data—Maternal HIV status and ART use was recorded from clinical records. Any mother whose HIV status was unknown had a HIV test done as part of antenatal care.

Pregnancy, delivery and gestation—All births occurred at a single public hospital. Gestational age at delivery was calculated based on ultrasound measurements in the second trimester of pregnancy. Where no ultrasound measurement was available, symphysis-fundal height, recorded by trained clinical staff at enrolment, or date of last normal menstrual

period was used to calculate gestation. Preterm birth was defined as a gestational age at delivery less than 37 completed weeks. Delivery details were recorded by study staff at birth.

2.4 Statistical analysis

Data were analysed using Stata 12 (StataCorp Inc, College Station, Texas, USA). Predictors were explored for HIV-uninfected and HIV-infected mothers separately, as the drivers for breastfeeding initiation and cessation may differ in these groups. Sociodemographic, psychosocial and gestational characteristics were compared between HIV-infected and healthy mothers using the unpaired t-test or the Mann-Whitney U test and the χ^2 test. Logistic regression models with non-initiation of breastfeeding as the outcome parameter were planned to determine associations with maternal sociodemographic and psychosocial factors and gestational outcomes. Among mothers who initiated breastfeeding, Cox proportional hazards models were used to explore the time until cessation of any- and exclusive breastfeeding. Exclusive breastfeeding was the period on non-supplemented breastfeeding; any breastfeeding included the time of exclusive breastfeeding, but also the time when breastfeeding was complemented with formula feeds and/or solid food. The University of Calgary Fenton Charts were used to create anthropometrical Z-scores adjusted for gestational age and gender⁴⁵. Both crude and adjusted relative risks (Poisson models) and hazards ratios (Cox models) were reported. In univariate analysis, variables with a P-value<0.2 were considered for the multivariate model, and an adjusted P-value<0.05 was considered as statistically significant.

2.5 Ethics

The DCHS was approved by the Human Research Ethics Committees of the Faculties of Health Sciences, University of Cape Town (HREC REF: 401/2009) and Stellenbosch University in South Africa; as well as by the Western Cape Department of Health Provincial Research Committee. Written informed consent was provided by all mothers and renewed annually.

3. Results

3.1 Sample Characteristics

Sociodemographic characteristics—The median age of enrolled women was 25.9 years (inter-quartile range (IQR) 22.0–30.8) at enrolment (Table 1). Approximately half were of black African ancestry (54%), with the remainder of mixed ancestry. Only 38% had completed secondary/tertiary level of education. Participants were predominantly unemployed (73%). Most mothers reported single relationship status, with 39% reporting that they were currently married or cohabiting. The majority of participants described receiving support from partners (n=473, 53% with moderate-considerable support; n=351, 39% with extreme support). A substantial proportion (37%) reported food insecurity. Running water was available in 68% of households, and electricity in 94%. Only 18 (9%) HIV-infected and 52 (7%) HIV-uninfected mothers were recruited following policy changes discontinuing free formula milk distribution in April 2015.

HIV infection and treatment—Approximately a fifth, $n=192$ (21%) of participants were HIV-infected. HIV and ARV data were available for 159 HIV-infected mothers (83%) from the hospital where deliveries took place. Most women received their HIV-diagnosis before the current pregnancy (122, 67%). Most HIV-infected mothers (154, 98%) were taking ARVs during pregnancy. Of the 5 women who were not on ARVs during pregnancy, one was diagnosed less than 30 days before childbirth and was on ARVs when labour began. Of the remaining 4 the reason for not being on ARVs was unclear. A minority of 16 women were known to default ARVs during pregnancy (10%), of whom 14 (89%) restarted before birth (median days before birth: 30 (IQR 11–137)). During pregnancy, the median CD4+ T-cell count was 393 cells/all (IQR 284–579), and the viral load was undetectable in 86% of women.

Pregnancy, obstetrical and gestational factors—Most [621 (69%)] of the index pregnancies were unplanned, and 313 (35%) of participants were primiparous. There were 126 (14%) preterm births.

Maternal mental health—Antenatal depression was found in 225 (25%) of mothers. The prevalence of psychological distress was similar, with 118 (21%) scoring above threshold. Emotional IPV occurred in 244 (27%) participants, physical IPV in 199 (22%) and sexual IPV in 63 (7%). 118 (13%) of women had suspected PTSD. Smoking and alcohol use during pregnancy were prevalent with 257 (29%) women with moderate-high smoking related risk and 101 (11%) with moderate-high alcohol related risk. Rates of mental health disorders were similar in both HIV infected and uninfected mothers (Table 1).

3.2 Differential Rates of breastfeeding by HIV status

Most ($n=772$, 86%) mothers initiated breastfeeding, but this was higher amongst HIV-uninfected mothers ($n=685$, 97%) compared to HIV-infected mothers ($n=87$, 45%), $p<0.001$. The median duration of any breastfeeding was 3 months (IQR 2–6). However, HIV-infected mothers continued breastfeeding longer than uninfected mothers (uninfected: median 3 months, IQR 2–6; HIV-infected: median 4 months, IQR 2–6, $P=0.022$). The median duration of exclusive breastfeeding was 2 months (IQR 1–4), with HIV-infected mothers exclusively breastfeeding longer than uninfected mothers [3 (IQR 1–5) versus 2 (IQR 1–4), $p=0.001$].

3.3 Predictors of breastfeeding initiation amongst HIV infected mothers

As nearly all uninfected mothers initiated breastfeeding, the Logistic regression model exploring predictors of non-initiation in this group was not executed. Thus, mothers considered for this analysis were HIV-infected, treated in Mbwekeni Clinic and with available PMTCT data ($N=164$). Of HIV-infected mothers, 7 were excluded because they were advised against breastfeeding due to the PMTCT protocol, or because their baby was unable to breastfeed. Of the 157 included in the analysis, 95 (61%) did not initiate breastfeeding. In multivariate analysis, working mothers were more likely to never initiate breastfeeding (OR 2.60, CI 1.08, 6.24). Mothers who were diagnosed with HIV during the current pregnancy were less likely to initiate breastfeeding, as compared to the mothers who knew their HIV status prior to pregnancy (OR 0.28, CI 0.11, 0.68) (Table 2). Depressive

symptoms were identified as a possible predictor of non-initiation, with a trend towards significance (OR 2.23, CI 0.99, 5.04).

3.4 Predictors of breastfeeding duration

We examined factors associated with duration of any breastfeeding among uninfected mothers. Multivariate analysis showed mothers of mixed race were less likely to discontinue any breastfeeding as compared to black mothers (aHR 0.59, CI 0.43–0.81). Working mothers were more likely to discontinue breastfeeding than unemployed mothers (aHR 1.37, CI 1.10–1.784), (Table 3). In the 68 HIV-infected women from the sample who initiated breastfeeding (43%), we investigated the time until they stopped any breastfeeding. In multivariate analysis, a trend towards an association was found between shorter duration of breastfeeding and several mental health measures, including depressive symptoms (aHR 1.84, CI 0.77–4.42) and trauma-exposure (aHR 2.20, CI 0.83–5.1). (Table 4).

3.5 Predictors for exclusive breastfeeding

Among HIV-uninfected mothers who initiated breastfeeding, Cox regression models were performed to explore predictors associated with time of (exclusive) breastfeeding. In crude analysis, mothers with recent IPV were less likely to discontinue exclusive breastfeeding (HR 0.88, CI 0.75 – 1.04). In multivariate analysis, only marital status remained a significant predictor. Married women less likely than their single counterparts (HR 0.77, CI 0.64–0.92) to discontinue exclusive breastfeeding (Table 5).

In contrast, among the sample of 65 HIV-infected mothers who initiated breastfeeding, the risk for early introduction of mixed feeding was explored by looking at the duration of exclusive breastfeeding. Mothers with significant alcohol use were nearly three times more likely to cease exclusive breastfeeding early (HR 2.93, CI 0.09–0.96). In multivariate analysis, no associations were found between any predictor and duration of exclusive breastfeeding (see Table 6).

Breastfeeding behaviour among both HIV-infected and uninfected mothers was not significantly affected following the phasing-out of infant formula milk after 1 April 2015 (Table 2, 3, 4, 5, 6).

4. Discussion

Despite near universal initiation of breastfeeding by uninfected mothers, breastfeeding initiation was low among HIV-infected mothers. In contrast, HIV-infected mothers had longer durations of any and exclusive breastfeeding when compared to uninfected mothers. Notable though, was duration of breastfeeding continuation was sub-optimal for all mothers, regardless of HIV status. Predictors of breastfeeding initiation and duration of any and exclusive breastfeeding also differed by maternal HIV status. For breastfeeding initiation among HIV-infected mothers, employment and a prior HIV diagnosis predicted lower rates of initiation. For continuation of any breastfeeding, for uninfected mothers, employment was an important predictor of shorter breastfeeding duration and ethnicity a predictor of longer breastfeeding duration. For HIV-infected mothers' ethnicity and employment were not predictors, whereas younger gestational age trended towards significance as a predictor for

longer duration of any breastfeeding. For continuation of exclusive breastfeeding, uninfected mothers who were married were more likely to engage in longer duration of exclusive breastfeeding.

Surprisingly, despite our sample reporting concerning rates of mental disorders, depression and other mental disorders were not significant predictors of negative breastfeeding outcomes as previously reported^{46–48}. Depression may need further investigation as a predictor for breastfeeding initiation among HIV-infected mothers, as our findings showed a trend towards significance. Some studies in high income countries, have demonstrated negative associations between the presence of perinatal depression and breastfeeding behaviours including intention and initiation⁴⁹ as well as duration of overall and exclusive breastfeeding^{50,51}, but other studies, also in high-income countries, have shown no effect of perinatal depression on breastfeeding behaviours⁵². The lack of an association between IPV and negative breastfeeding outcomes also requires further investigation. In general LMIC population, sexual IPV has been shown to increase exclusive breastfeeding rates⁵³, whilst a recent Zambian study in HIV infected mothers found that IPV lessened the duration of exclusive breastfeeding⁵⁴. Despite the growing number of studies exploring the relationships between mental disorders, psychosocial stressors, and breastfeeding, there are limited data from LMICs and by maternal HIV-status. Given evidence on the importance of both maternal mental health and breastfeeding for the health of mothers and infants, further exploration and understanding of associations and predictors is warranted.

Finally, for initiation of breastfeeding among HIV-infected mothers, we do not yet fully understand why an HIV diagnosis prior to pregnancy negatively impacts rates of breastfeeding initiation. This might be due to clinical differences in counselling; for example, mothers who knew of their HIV prior to pregnancy might not receive as intensive counselling as mothers diagnosed with HIV during pregnancy, or counselling that occurs when diagnosis is aligned with pregnancy might better address the types of challenges mothers face for both life-changing events. Differences in timing of HIV diagnosis might also translate to differential motivations to engage in breastfeeding and infant care. These surprising findings indicate the importance of comparing populations of mothers by HIV status as well as by HIV diagnosis and treatment differences.

Overall findings provide several important insights for targeting and timing of clinical care and future intervention development. First, findings indicate that future interventions should target specific sub-populations such as HIV-infected mothers because of distinct needs. Second, there are optimal opportunities for support and intervention during the postpartum period that differ by HIV status. For example, HIV-infected mothers need interventions to increase uptake of breastfeeding initiation immediately after birth, prior to the 3-month timepoint when exclusive breastfeeding stops (well before the recommended 6-month timepoint), and prior to the 4-month timepoint when any breastfeeding stops. In contrast, uninfected mothers did well in initiating breastfeeding but struggled with sustaining this, resulting in a very short duration of exclusive breastfeeding and continued breastfeeding. While both HIV-infected and uninfected mothers may benefit from interventions to improve duration of breastfeeding, these interventions would need to occur much earlier in the

postpartum period for uninfected mothers because they halted exclusive and mixed breastfeeding earlier in the postpartum period when compared to HIV-infected mothers.

Given that predictors of breastfeeding behaviour varied by mothers' HIV status, intervention approach and material would need to target differing mechanisms of change. For both uninfected and HIV-infected mothers, interventions for breastfeeding initiation would need to address structural barriers relating to employment or work-place and facilitators to breastfeeding continuation⁵⁵. Early return to work is a known risk factor for early discontinuation of breastfeeding⁵⁰. For HIV-infected moms specifically, interventions for breastfeeding initiation would require an additional focus on individual factors to improve coping with HIV and a new baby. Interestingly timing of HIV diagnosis mattered for breastfeeding behaviours among HIV-infected mothers. Working moms, who knew they were HIV infected before pregnancy were less likely to initiate breastfeeding.

It is important to note that a disconnect occurred between national policy changes and the implementation thereof across provinces. This study findings were recorded during a transitional-period in the Western Cape Province when infant formula was still provided by health facilities. This may explain the high rates of formula feeding despite very high levels of food insecurity, poverty and poor access to running water. The policy environment in this province during this time-period did not allow for active and visible support of breastfeeding. Misperceptions regarding the reasons free formula milk was discontinued has been reported among community members⁵⁶. We recommend that a follow-up study using the same comparison groups be undertaken to determine whether breastfeeding practices or their determinants have since changed.

Study limitations and strengths

Results are from a single low socio-economic area and may not be generalizable to women of dissimilar racial, ethnic and sociodemographic backgrounds. The sample size of HIV infected mothers who initiated breastfeeding was small and may have affected precision of estimates. This study provides contributes to existing literature by addressing geographic disparities through use of a large dataset from a LMIC setting, and via a robust comparison of mothers by HIV status in a country with one of the largest epidemics globally. The geographic focus upon LMICs, and population specific focus on mothers living with HIV, offer new insights into optimizing breastfeeding as a cost-effective strategy through population-specific tailoring and by maximizing of clinical moments of opportunity during postpartum to improve maternal and child health.

Conclusion

Findings highlight important issues that still need to be addressed to promote optimal infant feeding among all mothers regardless of HIV status. HIV infected mothers face differential challenges in adhering to recommended breastfeeding guidelines and require targeted interventions to improve breastfeeding initiation and exclusive breastfeeding duration.

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Appendices

Figure A.1.
Study flow chart of the selection procedure for the study sample

Table 1

Participant characteristics

	N	HIV-infected	Uninfected	All	P-value
Number of mothers		192 (21)	707 (79)	899 (100)	-
Clinic		179 (93)	306 (43)	485 (54)	<0.001
	899	13 (7)	401 (57)	414 (46)	
Breastfeeding					
Initiated breastfeeding	899	87 (45)	685 (97)	772 (86)	<0.001
All breastfeeding (time in months) [∞]	350	3.0 (2.0–6.0)	3.0 (2.0–6.0)	0.022	
Exclusive breastfeeding (time in months) [○]	720	2.0 (1.0–4.0)	2.0 (1.0–4.0)	<0.001	
Socio-demographics					
Maternal age (y)	899	29.7 (26.0–33.6)	24.8 (21.5–29.5)	25.9 (22.0–30.8)	<0.001
Birth Period	899	174 (91)	655 (93)	829 (92)	0.354
	< 1-apr-'15	18 (9)	52 (7)	70 (7)	
	≥ 1-apr-'15	178 (93)	307 (43)	485 (54)	<0.001
Ethnicity	899	14 (7)	400 (47)	414 (46)	
	Black	25 (13)	50 (7)	75 (8)	<0.001
	Mixed ancestry	118 (61)	368 (52)	486 (54)	
Education attained	899	44 (23)	241 (34)	285 (32)	
	Primary	5 (3)	48 (7)	53 (6)	
	Some secondary	46 (24)	194 (27)	240 (27)	0.334
	Completed secondary	115 (60)	431 (61)	546 (61)	0.772
	Any tertiary	77 (40)	275 (39)	352 (39)	
Employed	899	115 (60)	322 (46)	437 (49)	<0.001
Marital Status	898	110 (57)	500 (71)	610 (68)	<0.001
	Single	166 (86)	679 (96)	845 (94)	<0.001
	Married or cohabitating	71 (37)	161 (23)	232 (26)	<0.001
Receiving government grant	897	52 (27)	181 (26)	233 (26)	
Running water in home	895	45 (23)	199 (28)	244 (27)	
Electricity in home	896				
Socioeconomic status [◆]	899				
	Lowest SES				
	Low-moderate SES				
	Moderate-high SES				

	N	HIV-infected	Uninfected	All	P-value
People in household(—)					
High SES		24 (13)	166 (23)	190 (21)	
<5		123 (64)	328 (47)	451 (50)	<0.001
5 to 8	899	56 (29)	306 (43)	362 (40)	
>8		13 (7)	73 (10)	86 (9)	
Pre- and postnatal partner support					
None-slight		18 (9)	50 (7)	68 (8)	0.004
Moderate-Considerable	892	117 (62)	356 (51)	473 (53)	
Extreme		55 (29)	296 (42)	351 (39)	
Secure		78 (41)	480 (70)	558 (63)	<0.001
Insecure	879	111 (59)	210 (30)	321 (37)	
Food Security★					
Maternal mental health					
EPDS (above threshold)	899	51 (27)	174 (25)	225 (25)	0.580
SRQ-20 (above threshold)	899	37 (19)	151 (21)	188 (21)	0.528
IPV (above threshold)	899	35 (18)	209 (30)	244 (27)	0.002
	899	43 (22)	156 (22)	199 (22)	0.922
Physical		8 (4)	55 (8)	63 (7)	0.082
Sexual	899	128 (67)	541 (77)	669 (74)	0.017
No exposure		29 (15)	83 (12)	112 (12)	
Trauma Exposed	899	35 (18)	83 (12)	118 (13)	
Suspected PTSD		170 (89)	411 (58)	581 (65)	<0.001
No use		1 (1)	60 (8)	61 (7)	
Lower risk	899	16 (8)	191 (27)	207 (23)	
Moderate		5 (3)	45 (6)	50 (6)	
High risk		166 (86)	388 (55)	554 (62)	<0.001
No use		8 (4)	236 (33)	244 (27)	
Lower risk	899	8 (4)	65 (9)	73 (8)	
Moderate-high risk		10 (5)	18 (3)	28 (3)	
High risk		187 (97)	621 (88)	808 (90)	<0.001
No use		4 (2)	71 (10)	75 (8)	
Lower risk	899	0 (0)	14 (2)	14 (2)	
Moderate-high risk		1 (1)	1 (0)	2 (0)	
High risk					
Cannabis use risk					

	N	HIV-infected	Uninfected	All	P-value
Pregnancy and gestation					
Planned Pregnancy	897	62 (32)	214 (30)	276 (31)	0.606
Primiparous	899	37 (19)	276 (39)	313 (35)	<0.001
Method of delivery		144 (78)	571 (82)	715 (82)	0.228
		12 (6)	41 (6)	53 (6)	
Baby gender	874	29 (16)	77 (11)	106 (12)	
		87 (45)	341 (48)	428 (48)	0.473
	899	105 (55)	366 (52)	471 (52)	
Gestational age	899	160 (83)	613 (87)	773 (86)	0.233
		32 (17)	94 (13)	126 (14)	
Birthweight-for-GA	888	-0.5 (-1.2-0.2)	-0.6 (-1.3-0.1)	-0.5 (-1.3-0.1)	0.324
	888	18 (9)	61 (9)	79 (9)	0.753
HIV and ARV data					
HIV-diagnosis		136 (67)	-	-	-
	178	42 (24)	-	-	-
On ARV during pregnancy	178	176 (99)	-	-	-
CD4+ T-cell count during pregnancy	132	393 (284-579)	-	-	-
HIV viral load during pregnancy (log copies/mL)		7498 (3520-73481)	-	-	-
	83	71 (86)	-	-	-
Evidence of defaulting during pregnancy	178	18 (10%)	-	-	-
	18	16 (89%)	-	-	-
Feeding method opted before birth	178	89 (50)	-	-	-
	178	84 (47)	-	-	-
	18	5 (3)	-	-	-
Feeding method started after birth	178	85 (48)	-	-	-
		90 (51)	-	-	-
		1 (1)	-	-	-
		2 (1)	-	-	-
Reason for not exclusively breastfeeding in women starting exclusive formula after birth	178	70 (78)	-	-	-
	77	1 (1)	-	-	-

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	N	HIV-infected	Uninfected	All	P-value
Inadequate breastmilk		1 (1)	-	-	-
Premature infant		1 (1)	-	-	-
Medical condition of the infant		4 (4)	-	-	-
PMTCT protocol		1 (1)	-	-	-
Unknown	77	12 (13)	-	-	-

All numbers are n (%) or median (interquartile range).

Abbreviations: HIV=Human Immunodeficiency Virus. (y)=years. SES=socioeconomic status. EPDS=Edinburgh Postnatal Depression Score (Threshold=13). SRQ-20=Self-Reporting Questionnaire for psychological distress, including symptoms of depressive and anxiety disorders. (Threshold=8). IPV=Recent Intimate Partner Violence (past-year) (Threshold=mid-high frequency incidents). CTQ=Childhood Trauma Questionnaire (physical threshold=7, emotional abuse threshold=8, emotional neglect threshold=5, total threshold=36). GA=gestational age. SD=standard deviation. ARV=antiretrovirals. PI=protease inhibitor. NNRTI=non-nucleoside reverse transcriptase inhibitor. NVP=nevirapine. FTC=emtricitabine. TDF=tenofovir. AZT=zidovudine. PMTCT=prevention of mother-to-child-transmission.

∞

All breastfeeding: period while baby was breastfed, including the period of time where formula or solid foods were given besides breastfeeding.

○

Exclusive breastfeeding: period while baby was not receiving anything but breastmilk.

◆

Mixed ancestry = women belonging to a heterogeneous ethnic group living in the Western Cape, with ancestry from Europe, Malaysia and Southern Africa.

✦

The formula for socioeconomic status is standardized income + standardized education + standardized assets + (0.5*employment).

★

Food Security determined by the Food Security Questionnaire. Including questions towards size of meals, (frequency of) skipping meals by family members, experienced hunger in household and not eating due to lack of money for food.

Table 2

Logistic regression model on breastfeeding initiation in HIV-infected mothers.

HIV-infected mothers from Mbwekeni (n=157)						
		Univariate analysis		Multivariate analysis		
		Never breastfed (n=95)		Never breastfed (n=95)		
		N	OR	95% CI	OR	95% CI
Demographic						
Marital status	Single	95	-	-	-	-
	Married or cohabitating	62	0.98 (0.51, 1.81)	-	-	-
	Not working	119	-	-	-	-
Employment	Working	38	2.25 (1.02, 4.97)	-	2.60 (1.08, 6.24)	-
	Lowest SES	62	-	-	-	-
SES	Low-moderate SES	42	0.87 (0.40, 1.93)	-	-	-
	Moderate-high SES	39	0.84 (0.38, 1.89)	-	-	-
	High SES	14	1.30 (0.39, 4.35)	-	-	-
Government grant	No	64	-	-	-	-
	Yes	93	0.83 (0.43, 1.60)	-	-	-
Running water in home	No	71	-	-	-	-
	Yes	86	1.03 (0.54, 1.94)	-	-	-
Electricity in home	No	23	-	-	-	-
	Yes	134	1.24 (0.51, 3.01)	-	-	-
Age mother		157	1.03 (0.97, 1.09)	-	-	-
Birth Period	< 1-arp-'15	142	-	-	-	-
	>= 1-apr-'15	15	0.64 (0.22, 1.87)	-	1.02 (0.34, 3.04)	-
Number of children		157	1.04 (0.71, 1.5)	-	-	-
Food security	Secure	59	-	-	-	-
	Insecure	96	1.01 (0.52, 1.95)	-	-	-
HIV- and cART						
Diagnosis	Before pregnancy	121	-	-	-	-

HIV-infected mothers from Mbwekeni (n=157)						
		Univariate analysis			Multivariate analysis	
		N	OR	95% CI	Never breastfed (n=95)	95% CI
cART adherence during pregnancy		36	0.33	(0.15, 0.73)	0.28	(0.11, 0.68)
Adequate		144	-	-	-	-
Inadequate		13	0.88	(0.28, 2.77)	-	-
Maternal mental health						
EPDS score		117	-	-	-	-
Below threshold		40	1.84	(0.84, 3.93)	2.23	(0.99, 5.04)
Above threshold		110	-	-	-	-
Recent IPV		47	1.53	(0.75, 3.10)	-	-
Yes		129	-	-	-	-
Below threshold		28	0.86	(0.38, 1.95)	-	-
Above threshold		109	-	-	-	-
No exposure		24	1.06	(0.43, 2.60)	-	-
Trauma Exposed		24	0.90	(0.37, 2.2)	-	-
Suspected PTSD		141	-	-	-	-
No use		3	0.37	(0.42, 0.33)	-	-
Low		3	1.48	(0.75, 0.13)	-	-
Moderate		10	0.74	(0.65, 0.20)	-	-
High		-	-	-	-	-
Pregnancy and gestational outcomes						
Primigravid		129	-	-	-	-
No		28	0.60	(0.26, 1.38)	-	-
Yes		47	0.56	(0.28, 1.13)	0.47	(0.21, 1.01)
Planned pregnancy		118	-	-	-	-
Vaginal		10	1.66	(0.41, 6.76)	-	-
Elective CS		24	0.60	(0.40, 6.76)	-	-
Emergency CS		71	-	-	-	-
Girl		-	-	-	-	-

HIV-infected mothers from Mbwekeni (n=157)						
		Univariate analysis			Multivariate analysis	
		Never breastfed (n=95)			Never breastfed (n=95)	
		N	OR	95% CI	OR	95% CI
Gestational age	Boy	86	1.03	(0.54, 1.94)	-	-
	>= 37 weeks	136	-	-	-	-
	<37 weeks	21	2.09	(0.76, 5.74)	-	-
Birthweight for age Z-score		156	1.14	(0.87, 1.52)	-	-

Abbreviations: IRR=incidence rate ratio. SES=socioeconomic status. (y)=years. cART=combination antiretroviral therapy. EPDS=Edinburgh Postnatal Depression Score (Threshold=13). IPV=Recent Intimate Partner Violence (past-year) (Threshold=mid-high frequency incidents). SRQ-20=Self-Reporting Questionnaire for psychological distress, including symptoms of depressive and anxiety disorders. (Threshold=8). ASSIST= Alcohol, smoking and substance involvement test. CS=caesarean section.

Table 3

Cox regression model with time until stopping all breastfeeding as outcome in uninfected mothers

Uninfected mothers who initiated breastfeeding (n=685)						
	Univariate analysis			Multivariate analysis		
	N	HR	95% CI	Time until stopping bf	HR	P-value
Demographic						
Ethnicity						
Black	296	-	-	-	-	-
Mixed race	389	0.58 (0.46, 0.73)			0.59 (0.43, 0.81)	
Marital status						
Single	414	-	-	-	-	-
Married/cohabitating	270	0.67 (0.52, 0.86)			0.77 (0.59, 1.02)	
Employment						
Not working	495	-	-	-	-	-
Working	190	1.19 (0.93, 1.53)			1.37 (1.05, 1.78)	
SES						
Lowest SES	153	-	-	-	-	-
Low-moderate SES	177	1.10 (0.78, 1.56)			-	-
Moderate-high SES	194	1.38 (0.99, 1.92)			-	-
High SES	161	1.32 (0.94, 1.86)			-	-
Government grant						
No	365	-	-	-	-	-
Yes	318	0.78 (0.61, 0.98)			0.92 (0.66, 1.28)	
Running water in home						
No	196	-	-	-	-	-
Yes	485	1.00 (0.78, 1.29)			-	-
Electricity in home						
No	24	-	-	-	-	-
Yes	658	1.10 (0.57, 2.14)			-	-
Age mother (y)						
	685	0.99 (0.97, 1.01)			-	-
Birth Period						
< 1-apr-'15	634	-	-	-	-	-
>= 1-apr-'15	51	0.81 (0.40, 1.65)			0.95 (0.44, 2.04)	
Number of children	685	0.91 (0.81, 1.04)			-	-
Food security						
Secure	464	-	-	-	-	-
Insecure	205	1.15 (0.89, 1.47)			-	-

Uninfected mothers who initiated breastfeeding (n=685)						
		Univariate analysis			Multivariate analysis	
		Time until stopping bf		95% CI	HR	P-value
		N	HR			
Maternal Mental Health						
EPDS score	Below threshold	520	-	-	-	-
	Above threshold	165	1.04 (0.80, 1.35)		-	-
Recent IPV	No	437	-	-	-	-
	Yes	248	0.85 (0.66, 1.09)		0.96 (0.74, 1.24)	
SRQ-20	Below threshold	542	-	-	-	-
	Above threshold	143	1.02 (0.77, 1.35)		-	-
PTSD	No exposure	528	-	-	-	-
	Trauma Exposed	79	1.19 (0.84, 1.67)		-	-
	Suspected PTSD	78	1.12 (0.79, 1.58)		-	-
ASSIST alcohol risk	No use	374	-	-	-	-
	Low	230	0.72 (0.56, 0.94)		1.03 (0.74, 1.44)	
	Moderate	65	0.66 (0.42, 1.04)		0.97 (0.58, 1.60)	
	High	16	0.94 (0.44, 2.01)		1.18 (0.55, 2.56)	
Pregnancy and gestational outcomes						
Primigravid	No	425	-	-	-	-
	Yes	260	1.33 (0.058, 1.68)		1.21 (0.85, 1.72)	
Planned pregnancy		208	1.058 (0.83, 1.35)		-	-
Mode of delivery	Vaginal	554	-	-	-	-
	Elective CS	40	0.86 (0.51, 1.45)		0.75 (0.44, 1.27)	
	Emergency CS	73	1.27 (0.90, 1.78)		1.16 (0.82, 1.66)	
Gender baby	Girl	330	-	-	-	-
	Boy	355	1.08 (0.86, 1.36)		-	-
Gestational age	>=37 weeks	597	-	-	-	-
	<37 weeks	88	1.26 (0.92, 1.73)		1.14 (0.81, 1.62)	
Birthweight for age		676	1.13 (1.01, 1.27)		1.10 (0.98, 1.24)	

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Abbreviations: HR=hazard ratio, bf=breastfeeding, SES=socioeconomic status, (y)=years, EPDS=Edinburgh Postnatal Depression Score (Threshold=13), IPV=Recent Intimate Partner Violence (past-year) (Threshold=mid-high frequency incidents), SRQ-20=Self-Reporting Questionnaire for psychological distress, including symptoms of depressive and anxiety disorders, (Threshold=8), ASSIST= Alcohol, smoking and substance involvement test, CS=caesarean section.

Table 4
Cox regression model with time until stopping all breastfeeding as outcome in HIV-infected mothers

HIV-infected mothers from Mbwekeni who initiated breastfeeding (n=68)						
		Univariate analysis			Multivariate analysis	
		Time until stopping bf			Time until stopping bf	
		N	HR	95% CI	HR	95% CI
Demographic						
Marital status	Single	41	-	-	-	-
	Married or cohabitating	27	0.70 (0.38, 1.29)	-	-	-
Employment	Not working	57	-	-	-	-
	Working	11	0.73 (0.32, 1.65)	-	-	-
SES	Lowest SES	26	-	-	-	-
	Low-moderate SES	19	0.92 (0.45, 1.89)	-	-	-
	Moderate-high SES	18	1.48 (0.69, 3.16)	-	-	-
	High SES	5	1.34 (0.49, 3.63)	-	-	-
Government grant	No	26	-	-	-	-
	Yes	42	0.77 (0.43, 1.40)	-	-	-
Running water in home	No	31	-	-	-	-
	Yes	37	1.52 (0.84, 2.77)	-	1.42 (0.76, 2.64)	-
Electricity in home	No	11	-	-	-	-
	Yes	57	1.10 (0.51, 2.38)	-	-	-
Age mother		68	1.00 (0.95, 1.05)	-	-	-
Birth Period	< 1-apr-'15	60	-	-	-	-
	>= 1-apr-'15	8	1.89 (0.54, 6.59)	-	-	-
Number of children		68	0.82 (0.57, 1.20)	-	-	-
Food security	Secure	26	-	-	-	-
	Insecure	42	0.72 (0.40, 1.28)	-	-	-
HIV- and cART						
Diagnosis	Before pregnancy	45	-	-	-	-

HIV-infected mothers from Mbwekeni who initiated breastfeeding (n=68)						
	Univariate analysis			Multivariate analysis		
		Time until stopping bf			Time until stopping bf	
		N	HR 95% CI		HR 95% CI	
cART adherence during pregnancy	During pregnancy	23	1.30 (0.70, 2.40)	-	-	
	Adequate	62	-	-	-	
	Inadequate	6	1.68 (0.59, 4.80)	-	-	
Maternal mental health						
EPDS score	Below threshold	55	-	-	-	
	Above threshold	13	1.64 (0.85, 3.19)	1.84 (0.77, 4.43)		
Recent IPV	No	51	-	-	-	
	Yes	17	0.60 (0.28, 1.29)	0.63 (0.27, 1.49)		
SRQ-20	Below threshold	55	-	-	-	
	Above threshold	13	1.87 (0.94, 3.74)	1.37 (0.54, 3.47)		
PTSD (broad)	No exposure	47	-	-	-	
	Trauma Exposed	10	2.07 (0.92, 4.63)	2.05 (0.83, 5.08)		
ASSIST alcohol risk	Suspected PTSD	11	1.51 (0.69, 3.31)	0.98 (0.41, 2.32)		
	No use	60	-	-	-	
	Low	2	2.45 (0.58, 10.39)	-	-	
	Moderate	1	0.0000 (-, -)	-	-	
	High	5	1.97 (0.77, 5.038)	-	-	
Pregnancy and gestational outcomes						
Primigravid	No	53	-	-	-	
	Yes	15	1.47 (0.72, 3.00)	-	-	
Planned pregnancy		25	0.72 (0.39, 1.34)	-	-	
Mode of delivery	Vaginal	49	-	-	-	
	Elective CS	3	2.05 (0.62, 6.73)	-	-	
	Emergency CS	13	0.81 (0.37, 1.76)	-	-	
Gender baby	Girl	31	-	-	-	
	Boy	37	1.20 (0.67, 2.16)	-	-	

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HIV-infected mothers from Mbwekeni who initiated breastfeeding (n=68)						
			Univariate analysis		Multivariate analysis	
			Time until stopping bf		Time until stopping bf	
		N	HR	95% CI	HR	95% CI
Gestational age	>= 37 weeks	62	-	-	-	-
	<37 weeks	6	0.29	(0.09, 0.96)	0.34	(0.09, 1.20)
Birthweight for age		65	0.89	(0.71, 1.11)	-	-

Abbreviations: HR=hazard ratio. bf=breastfeeding. SES=socioeconomic status. (y)=years. cART=combination antiretroviral therapy. EPDS=Edinburgh Postnatal Depression Score (Threshold=13). IPV=Recent Intimate Partner Violence (past-year) (Threshold=mid-high frequency incidents). SRQ-20=Self-Reporting Questionnaire for psychological distress, including symptoms of depressive and anxiety disorders. (Threshold=8). ASSIST= Alcohol, smoking and substance involvement test. CS=caesarean section.

Cox regression model with time until stopping exclusive breastfeeding as outcome in uninfected mothers

Table 5

Uninfected mothers who initiated breastfeeding (n=685)						
		Univariate analysis		Multivariate analysis 1		
		Time until stopping ebf		Time until stopping ebf		
	N	HR	95% CI	HR	95% CI	
Demographic						
Ethnicity						
Black	296	-	-	-	-	-
Mixed race	389	0.92 (0.79, 1.08)		-	-	-
Marital status						
Single	414	-	-	-	-	-
Married/cohabitating	270	0.77 (0.66, 0.91)		0.77 (0.64, 0.92)		
Employment						
Not working	495	-	-	-	-	-
Working	190	1.19 (1.00, 1.42)		1.190 (0.98, 1.45)		
SES						
Lowest SES	153	-	-	-	-	-
Low-moderate SES	177	1.15 (0.92, 1.44)		1.12 (0.89, 1.42)		
Moderate-high SES	194	1.18 (0.95, 1.48)		1.16 (0.91, 1.47)		
High SES	161	1.20 (0.95, 1.51)		1.08 (0.83, 1.40)		
Government grant						
No	365	-	-	-	-	-
Yes	318	0.87 (0.74, 1.01)		0.92 (0.73, 1.15)		
Running water in home						
No	196	-	-	-	-	-
Yes	485	1.11 (0.93, 1.32)		-	-	-
Electricity in home						
No	24	-	-	-	-	-
Yes	658	1.34 (0.86, 2.07)		1.08 (0.67, 1.74)		
Age mother						
	685	0.99 (0.98, 1.01)		-	-	-
Birth Period						
< 1-apr-'15	634	-	-	-	-	-
>= 1-apr-'15	51	0.97 (0.67, 1.40)		-	-	-
Number of children						
	685	0.97 (0.90, 1.06)		-	-	-
Food security						
Secure	464	-	-	-	-	-
Insecure	205	1.01 (0.85, 1.20)		-	-	-

Uninfected mothers who initiated breastfeeding (n=685)						
			Univariate analysis		Multivariate analysis 1	
			Time until stopping ebf		Time until stopping ebf	
	N	HR	95% CI	HR	95% CI	
Maternal mental health						
EPDS score	520	-	-	-	-	-
Recent IPV	165	1.00	(0.83, 1.20)	-	-	-
	437	-	-	-	-	-
	248	0.88	(0.75, 1.04)	0.90	(0.76, 1.07)	
SRQ-20	542	-	-	-	-	-
	143	1.02	(0.85, 1.24)	-	-	-
PTSD	528	-	-	-	-	-
	79	1.05	(0.82, 1.34)	-	-	-
	78	0.99	(0.77, 1.27)	-	-	-
ASSIST alcohol risk	374	-	-	-	-	-
	230	1.00	(0.84, 1.19)	-	-	-
	65	0.96	(0.73, 1.27)	-	-	-
	16	1.38	(0.84, 2.28)	-	-	-
Pregnancy and gestational outcomes						
Primigravida	425	-	-	-	-	-
	260	1.12	(0.95, 1.31)	0.97	(0.76, 1.23)	
Planned pregnancy	208	0.99	(0.83, 1.17)	-	-	-
Mode of delivery	554	-	-	-	-	-
	40	0.99	(0.70, 1.39)	-	-	-
	73	0.94	(0.74, 1.21)	-	-	-
Gender baby	330	-	-	-	-	-
	355	0.99	(0.84, 1.15)	-	-	-
Gestational age	597	-	-	-	-	-
	88	0.97	(0.78, 1.25)	-	-	-
Birthweight for age	676	1.04	(0.96, 1.12)	-	-	-

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Abbreviations: HR=hazard ratio. ebf=exclusive breastfeeding. SES=socioeconomic status. (y)=years. EPDS=Edinburgh Postnatal Depression Score (Threshold=13). IPV=Recent Intimate Partner Violence (past-year) (Threshold=mid-high frequency incidents). SRQ-20=Self-Reporting Questionnaire for psychological distress, including symptoms of depressive and anxiety disorders. (Threshold=8). ASSIST=Alcohol, smoking and substance involvement test. CS=caesarean section.

Table 6
Cox regression model with time until stopping exclusive breastfeeding as outcome in HIV-infected mothers

HIV-infected mothers from Mbwakeni who initiated breastfeeding (n=65)						
			Univariate analysis		Multivariate analysis	
			Time until stopping ebf		Time until stopping ebf	
			N	HR	95% CI	95% CI
Demographic						
Marital status	Single		41	-	-	-
	Married or cohabitating		27	1.11	(0.65, 1.91)	
Employment	Not working		57	-	-	-
	Working		11	1.10	(0.51, 2.40)	
SES	Lowest SES		26	-	-	-
	Low-moderate SES		19	1.51	(0.78, 2.90)	
	Moderate-high SES		18	1.56	(0.80, 3.07)	
	High SES		5	2.12	(0.71, 6.33)	
Government grant	No		26	-	-	-
	Yes		42	0.92	(0.54, 1.60)	
Running water in home	No		31	-	-	-
	Yes		37	1.02	(0.60, 1.74)	
Electricity in home	No		11	-	-	-
	Yes		57	1.39	(0.68, 2.87)	
Age mother			68	1.01	(0.97, 1.06)	
Birth Period	<1-apr-'15		60	-	-	-
	>= 1-apr-'15		8	1.65	(0.63, 4.31)	
Number of children			68	0.89	(0.66, 1.21)	
Food security	Secure		26	-	-	-
	Insecure		42	0.75	(0.44, 1.29)	
HIV- and cART						
Diagnosis			45	-	-	-
	During pregnancy			-	-	-

HIV-infected mothers from Mbwekeni who initiated breastfeeding (n=65)									
Univariate analysis					Multivariate analysis				
		Time until stopping ebf			Time until stopping ebf				
		N	HR	95% CI	N	HR	95% CI	HR	95% CI
cART adherence during pregnancy		23	1.33 (0.76, 2.31)		62	-	-		
Before pregnancy									
Adequate		62	-	-					
Inadequate		6	0.56 (0.17, 1.78)						
Maternal mental health									
EPDS score									
Below threshold		55	-	-					
Above threshold		13	1.19 (0.63, 2.26)						
Recent IPV									
No		51	-	-					
Yes		17	0.97 (0.54, 1.76)						
SRQ-20									
Below threshold		55	-	-					
Above threshold		13	1.13 (0.60, 2.14)						
PTSD (broad)									
No exposure		47	-	-					
Trauma Exposed		10	1.07 (0.50, 2.31)						
Suspected PTSD									
Suspected PTSD		11	1.28 (0.63, 2.57)						
ASSIST alcohol risk									
No use		60	-	-					
Low		2	1.08 (0.26, 4.49)						
Moderate		1	0.00 (-, -)						
High		5	2.96 (0.88, 9.93)						
Pregnancy and gestational outcomes									
Primigravid									
No		53	-	-					
Yes		15	1.34 (0.71, 2.50)						
Planned pregnancy									
Planned pregnancy		25	0.70 (0.40, 1.22)						
Mode of delivery									
Vaginal		49	-	-					
Elective CS		3	3.37 (0.78, 14.56)						
Emergency CS									
Emergency CS		13	1.16 (0.60, 2.22)						
Gender baby									
Girl		31	-	-					
Boy		37	0.95 (0.56, 1.61)						

HIV-infected mothers from Mbwekeni who initiated breastfeeding (n=65)						
	Univariate analysis			Multivariate analysis		
		N	HR	95% CI	Time until stopping ebf	95% CI
Gestational age	>= 37 weeks	62	-	-	-	-
	<37 weeks	6	0.38	(0.15, 0.97)		
Birthweight for age Z-score		68	0.88	(0.70, 1.10)		

Abbreviations: HR=hazard ratio. ebf= exclusive breastfeeding. SES=socioeconomic status. (y)=years. cART=combination antiretroviral therapy. EPDS=Edinburgh Postnatal Depression Score (Threshold=13). IPV=Recent Intimate Partner Violence (past-year) (Threshold=mid-high frequency incidents). SRQ-20=Self-Reporting Questionnaire for psychological distress, including symptoms of depressive and anxiety disorders. (Threshold=8). ASSIST= Alcohol, smoking and substance involvement test. CS=caesarean section.